Amendments to the Specification:

Please replace the paragraph at page 6, lines 23 and 24, with the following amended paragraph:

FIG. 3A is a view showing a light intensity distribution formed by a CGH 6a. FIG. 3B is a view showing a light intensity distribution formed by a CGH 6b. FIG. 3C is a view showing an example of quadruple illumination.

Please replace the paragraph at page 6, lines 25 and 26, with the following amended paragraph:

FIG. 4A is a view showing a light intensity distribution formed by a CGH 6a. FIG. 4B is a view showing a light intensity distribution formed by a CGH 6b. FIG. 4C is a view showing an example of a dipole illumination.

Please replace the paragraph at page 7, lines 1 and 2, with the following amended paragraph:

FIG. 5A is a view showing a light intensity distribution formed by a CGH 6a. FIG. 5B is a view showing a light intensity distribution formed by a CHG 6b. FIG. 5C is a view showing an example of a dipole illumination orthogonal to FIG.[[4]] 4C.

Please replace the paragraph at page 7, lines 3 to 5, with the following amended paragraph:

FIG. 6A is a view showing a light intensity distribution formed by a CGH 6a. FIG. 6B is a view showing a light intensity distribution formed by a CGH 6b. FIG. 6C is a view showing an example of an illumination with no polarization in the central part and tangential polarization in the periphery.

Please replace the paragraph at page 7, lines 6 to 8, with the following amended paragraph:

FIG. 7A is a view showing a light intensity distribution formed by a CGH 6a. FIG. 7B is a view showing a light intensity distribution formed by a CGH 6b. FIG. 7C is a view showing an example of an annular illumination with tangential polarization in ±45° directions.

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Please replace the paragraph at page 7, lines 11 and 12, with the following amended paragraph:

FIG. 9A is a view showing a light intensity distribution formed by a CGH. FIG. 9B is a view showing a light intensity distribution formed by a CGH. FIG. 9C is a view showing a light intensity distribution formed by a CGH. FIG. 9D is a view showing a light intensity distribution formed by a CGH. FIG. 9E is a view showing an example of an annular illumination with tangential polarization.

Please replace the paragraph at page 7, lines 15 to 18, with the following amended paragraph:

FIG. 11A is a view showing a light intensity distribution formed by a CGH. FIG. 11B is a view showing a light intensity distribution formed by a CGH. FIG. 11C is a view showing an example of an illumination with non-polarization in ±45° directions around a cross-shaped non-illuminated part, and with tangential polarization in ±90° directions.

Please replace the paragraph at page 11, line 24 to page 12, line 22, with the following amended paragraph:

FIG. 3 is a view FIGs. 3A to 3C are views showing the principle, for example, of the quadruple illumination as an effective light source on the X and Y axes. As illustrated in FIG. 3C, it is desirable that the effective light source on the Y- axis has a lateral polarization, and the effective light source on the X-axis has a longitudinal polarization. The CGH 6a makes a distribution on the X-axis of the element 10 like a 61a1 and 61a2 as shown in FIG. 3A. The polarization state is a linear polarization in the longitudinal direction. On the other hand, the CGH 6b makes a distribution on the Y-axis of the element 10 like a 61b1 and 61b2 as shown in FIG. 3B. The polarization state is a linear polarization in the lateral direction. The same CGH 6a and 6b can be used, but rotated by 90° when arranged. The polarization controlling elements 5a and 5b control the polarization direction, and use a rotational λ / 2 plate and the like. Since the polarization controlling elements 5a and 5b are separate from each other, the polarization state of lights that have passed the CGH 6a and 6b can be controlled independently to lead them to the integrator 10. The resultant effective light source is shown in FIG. 3C,

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by which illumination is materialized whose polarization direction is a tangential direction orthogonal to a line that connects the center.

Please replace the paragraph at page 13, line 8 to line 25, with the following amended paragraph:

The CGH works effectively for a dipole illumination. ~~FIG. 4 shows~~ FIGs. 4A to 4C show a dipole illumination formed on the X-axis. Like FIG. [[3]] 3A, the CGH 6a makes a distribution on the X-axis of the element 10 like 62a1 and 62a2 as shown in FIG. 4A. The polarization state is linear polarization in a longitudinal direction. On the other hand, the CGH 6b also makes a distribution on the X-axis of the element 10 like a 61b1 and 61b2 as shown in FIG. 4B. The polarization state is linear polarization in a longitudinal direction. The same CGH 6a and 6b can be used in the same arrangement. The operations of the polarization controlling elements 5a and 5b provide the same polarization state to lights that have passed the CGH 6a and 6b. The polarization controlling elements 5a and 5b merely rotate polarization direction and do not reduce the light intensity. Therefore, the dipole illumination has the same efficiency as the quadruple illumination in FIG. [[3]] 3C.

Please replace the paragraph at page 13, line 26 to page 14, line 13, with the following amended paragraph:

FIG. [[5]] 5C is a view of a dipole illumination rotated by 90° from that of FIG. [[4]] 4C. The CGH 6a makes a distribution on the Y-axis of the element 10 like 63a1 and 63a2 shown in FIG. 5A. The polarization state is linear polarization in the lateral direction. On the other hand, the CGH 6b also makes a distribution on the Y-axis like 63b1 and 63b2 shown in FIG. [[5C]] 5B. The polarization direction is also a lateral direction. The same CGH 6a and 6b as FIG. [[4]] 4C can be used although rotated by 90°

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when arranged. Also in this case, the operations of the polarization controlling elements

5a and 5b provide the light having passed the CGH 6a and 6b to the same polarization

state. The illumination efficiency is the same as that of the quadruple illumination of FIG.

[[3]] 3C.

Please replace the paragraph at page 14, line 14 to page 15, line 5, with the following amended paragraph:

The CGH can easily form a more complicated effective light distribution. FIG.

[[6]] 6C shows one embodiment that forms an effective light source having a central part

with no polarization, and a peripheral part with a tangential polarization. In FIG. [[6]]

6A, the intensity at the central portion 64a of the effective light source formed by the

CGH 6a is half the intensity of the peripheral portions 64a1 and 64a2, and the

polarization direction is adjusted to be a longitudinal direction. As shown in FIG. 6B,

[[The]] the intensity at the central portion 64b of the effective light source formed by the

CGH 6b is half the intensity of the peripheral portions 64b1 and 64b2, and the

polarization direction is controlled to be a lateral direction. The intensity difference is

illustrated in colors. If they are synthesized, an effective light source has a uniform

intensity distribution, in which the central part has no polarization, and only the periphery

has a tangential polarization as shown in FIG. 6C.

Please replace the paragraph at page 15, line 6 to line 19, with the following amended paragraph:

The polarization direction is controllable in not only longitudinal and lateral

directions, but any arbitrary direction, if, for example, a polarization unit 5 includes a

rotational $\lambda / 2$ plate, by controlling a set angle of the $\lambda / 2$ plate. FIG. [[7]] 7C is an

example of an annular illumination that has a tangential polarization state by combining

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±45° polarization directions. One CGH 6a forms effective light sources 65a1 and 65a2 in

the +45 direction as illustrated in FIG. 7A, and the other CGH 6b forms effective light

sources 65b1 and 65b2 in the −45 direction as illustrated in FIG. 7B. The superimposed

light sources form the annular illumination on the integrator 10 in the ±45° polarization

directions.

**Please replace the paragraph at page 15, line 20 to line 24, with the following amended
paragraph:**

An effective light source distribution can also be formed as shown in ~~FIG. 11~~

FIGs. 11A to 11C, which has a cross-shaped non-illuminated part in the center, no

polarization in the ±45° directions in its periphery, and a tangential polarization in the 0°

and ±90° directions.

**Please replace the paragraph at page 17, line 12 to line 23, with the following amended
paragraph:**

A provision of many kinds of CGHs would take time for exchange and increase

the cost. The number of necessary CGHs can be reduced if each CGH has a rotational

function. For example, suppose the illustrative dipole illuminations shown in FIGs. [[4]]

4C and [[5]] 5C, where both dipole illuminations are different in that the same shape is

simply rotated by 90° between FIGs. . [[4]] 4C and [[5]] 5C. A description will now be

given of FIG. [[4]] 4C by referring to the system's numerals in FIG. 1. The CGHs 6a and

6b may be exactly the same since they form the same effective light source shape on the

integrator 10. In other words, the same CGH can be used.

**Please replace the paragraph at page 17, line 24 to page 18, line 12, with the following
amended paragraph:**

The dipole in FIG. [[5]] 5C is the dipole shape of FIG. [[4]] 4C rotated by 90°. In

this case, the CGH used in the system of FIG. [[4]] 4C may be rotated 90°. Accordingly,

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if the CGH itself has a rotation function, there is no need to exchange the CGH when

changing from the effective light source shown in FIG. [[4]] 4C to that of FIG. [[5]] 5C.

If each dipole structure in the quadruple in the system shown in FIG. [[3]] 3C is

equivalent to that shown in FIGs. [[4]] 4C and [[5]] 5C, or if the portions 61a1 and a2 in

FIG. [[3]] 3A are equivalent to the portions 62a1 and a2 in FIG. [[4]] 4A, and the

portions 61b1 and b2 in FIG. [[3]] 3B are equivalent to the portions 63b1 and b2 in FIG.

[[5]] 5B, two CGHs of the same type are needed to create the effective light source

shown in FIGs. 3 to 5 3C, 4C and 5C. In this case, "equivalent" means the same shape,

ignoring the directionality.

Please replace the paragraph at page 19, line 16 to page 20, line 8, with the following amended paragraph:

FIG. 9 is FIGs. 9A to 9E are an exemplary annular illumination that has a

tangential polarization direction in the system of FIG. 8. Since four polarization

directions are controllable along four optical paths, the instant embodiment forms annular

illumination by combining four-directional linearly polarized rays of 0°, 90°, and ±45°.

In other words, the first optical path forms portions 61A1 and A2 in the effective light

source in the 0° polarization direction. The second optical path forms portions 61B1 and

B2 in the effective light source in the 90° polarization direction. The third optical path

forms portions 61C1 and C2 in the effective light source in the +45° polarization

direction. The fourth optical path forms portions 61D1 and D2 in the effective light

source in the -45° polarization direction. Thus, the whole annular illumination is formed.

A CGH is used to make any effective light source. The linearly polarized light is

arranged at an outer periphery of the effective light source in a tangential direction.

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Please replace the paragraph at page 21, line 5 to line 23, with the following amended paragraph:

One issue in the illumination optical system that handles the polarization state is the way of detecting the light intensity. The optical system shown in FIG. 1 arranges the beam splitter 17 after the integrator 10, monitors the light intensity of light reflecting at 17 by a light integrator unit L1 as a monitor section, and controls the exposure dose. However, the beam splitter 17 is disposed obliquely to the optical axis of the illumination optical system, and the reflectance naturally varies depending upon polarizations. The illumination optical system of the embodiment in FIG. 1 handles the complex selection of the polarization directions, i.e., longitudinal and lateral directions as in ~~FIG. 3 to FIG. 5~~ FIGs. 3C, 4C and 5C, and ±45° directions as in FIG. [[6]] 6C or other angles, and has difficulties in correctly monitoring the energy that the illumination optical system provides for the reticle by using a light intensity detecting system having polarization characteristics.

Please replace the paragraph at page 21, line 24 to page 22, line 8, with the following amended paragraph:

In some cases, it is necessary to balance the light intensities among optical paths. For example, a difference between the intensity of the effective light source on the X-axis of the system in FIG. [[3]] 3C and that of the effective light source on the Y-axis causes a difference in critical dimension between the exposed longitudinal and lateral lines. This difference in light intensity stems from the performance of the beam splitter 3 and the individual differences of the CGHs themselves, and it may be regarded as a difference between the optical paths after being split by the element 3.

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Please replace the paragraph at page 22, line 9 to line 14, with the following amended paragraph:

On the other hand, the dipole system like ~~FIG. 4 or FIG. 5~~ <u>FIG. 4C or FIG. 5C</u>

forms the same image of an effective light source, the same polarization directions

between the split optical paths, unlike FIG. [[3]] <u>3C</u>, and thus requires no light intensity

matching between the split optical paths.

Please replace the paragraph at page 22, line 15 to line 22, with the following amended paragraph:

Therefore, such an effective light source as FIG. [[3]] <u>3C</u> requires an adjustment

of light intensities between the split optical paths before an exposure. The present

embodiment detects and adjusts the light intensities between the split optical paths by

using a movable detector 18 that is arranged at a position conjugate to the reticle surface

as well as calibrating the light integrator L1's value.

Please replace the paragraph at page 24, line 13 to line 16, with the following amended paragraph:

After that, a light intensity balance is adjusted for each optical path. As

described, this step may be omitted if there is no light intensity balance required as in the

dipole illumination shown in FIGs. [[4]] <u>4C</u> and [[5]] <u>5C</u>.